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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/612,925	07/07/2003	Takahiro Kawano	239801US2	6929
22850	7590	07/27/2005	EXAMINER	
OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C.			NADAV, ORI	
1940 DUKE STREET			ART UNIT	
ALEXANDRIA, VA 22314			PAPER NUMBER	
			2811	

DATE MAILED: 07/27/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/612,925	KAWANO ET AL.	
	Examiner	Art Unit	
	Ori Nadav	2811	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 July 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-44 is/are pending in the application.
- 4a) Of the above claim(s) 2,3,7-20 and 25-38 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,4-6,21-24 and 39-44 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>7/13/05</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Objections

Claim 43 is objected to because of the following informalities: Claim 43 recites the limitation "the first connecting gate" in line 4. There is insufficient antecedent basis for this limitation in the claim. Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1, 4-6, 21-24 and 39-41 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The claimed limitations of gate wiring is arranged between the main electrodes and upper surfaces of the main electrodes are higher than the highest portion of an upper surface of the gate wiring, as recited in claims 1, 6 and 24, are unclear as to which elements the gate wiring is arranged between, and which elements are higher than the highest portion of an upper surface of the gate wiring.

The claimed limitation of an upper surface of the main electrode is higher than the highest portion of the upper surface of the gate wiring under the first connecting plate, as recited in claim 42, is unclear as to which element is located under the first connecting plate.

The claimed limitation of the at least on main electrode includes a first main electrode and a second main electrode, as recited in claim 43, is unclear as to how on the at least main electrode a first main electrode and a second main electrode can be included.

The claimed limitation of the at least on main electrode includes a first main electrode and a second main electrode and the gate wiring is one of gate wiring layers and the gate wiring is the uppermost layer of the gate wiring layers under an area in which the first connecting gate is connected to the first main electrode and the second main electrode, as recited in claim 43, are unclear as to the structural relationship between the main electrode, the first main electrode, the second main electrode, the gate wiring, the gate wiring layers and the first connecting gate.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 4-6, 21-24 and 39-44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nagata et al. (6,316,814) in view of Applicant Admitted Prior Art (AAPA).

Nagata et al. teach in figure 1A and related text a semiconductor device comprising:

a semiconductor layer which includes a first semiconductor region 14 of a first conductivity type, a base region 12 of a second conductivity type, and a plurality of second semiconductor regions 20 of the first conductivity type;

a gate wiring 13 which is formed on the semiconductor layer via a first insulating film;

a plurality of main electrodes 15A (or the electrode located below 15A, see also figure 1B) which are electrically connected to the plurality of second semiconductor regions and which are insulated from the gate wiring, wherein the gate wiring is arranged between the main electrodes and upper surfaces of the main electrodes are higher than the highest portion of an upper surface of the gate wiring.

Nagata et al. do not teach a connecting plate which is directly connected onto the upper surfaces of the main electrodes.

AAPA teaches in figure 21 a connecting plate is directly connected onto the upper surfaces of the main electrodes of the device.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to connect a connecting plate directly onto the upper surfaces of the electrodes of Nagata et al.'s device in order to provide good connection between the source electrodes and the external wirings.

Regarding claims 4, 21-23 and 39-41, AAPA teaches gate wiring 2107 comprising aluminum, and a connecting plate connected to a lead frame. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to form

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the main electrodes and the connecting plate of a plurality of metal layers comprising aluminum and to connect the connecting plate to a lead frame in Nagata et al.'s device in order to reduce the contact resistance between the main electrodes and the lead frame and in order to provide external connections to the device.

Regarding claim 4, Nagata et al. teach a second insulating film extends between plurality of metal layers.

Regarding claim 5, Nagata et al. teach in figure 1 plurality of main electrodes are formed apart from the gate wiring with a gap there between.

Regarding the process limitations recited in claims 23 and 41 ("the first connecting plate is connected to the first main electrode and the second main electrode by ultrasonic bonding") these would not carry patentable weight in this claim drawn to a structure, because distinct structure is not necessarily produced.

Note that a "product by process" claim is directed to the product per se, no matter how actually made, *In re Hirao*, 190 USPQ 15 at 17 (footnote 3). See also *In re Brown*, 173 USPQ 685; *In re Luck*, 177 USPQ 523; *In re Fessmann*, 180 USPQ 324; *In re Avery*, 186 USPQ 161; *In re Wertheim*, 191 USPQ 90 (209 USPQ 554 does not deal with this issue); and *In re Marosi et al.*, 218 USPQ 289, all of which make it clear that it is the patentability of the final product per se which must be determined in a "product by process" claim, and not the patentability of the process, and that an old or obvious

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product produced by a new method is not patentable as a product, whether claimed in "product by process" claims or not. Note that the applicant has the burden of proof in such cases, as the above case law makes clear.

Regarding claims 6, 24 and 43, Nagata et al. teach a first gate electrode which is formed in the cell forming region and controls continuity between the first semiconductor region and the second semiconductor region; and a plurality of main electrodes which are electrically connected to the plurality of second semiconductor regions respectively and which are formed at predetermined intervals in the cell forming region on the semiconductor layer.

Regarding claim 24, Nagata et al. do not teach a first semiconductor layer of a first conductivity type. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to form a first semiconductor layer of a first conductivity type in Nagata et al.'s device in order to improve the electrical isolation of the device.

Response to Arguments

Applicant's arguments with respect to claims 1, 4-6, 21-24 and 39-44 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. References B-D are cited as being related to main electrodes being higher than the highest portion of an upper surface of the gate wiring.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ori Nadav whose telephone number is 571-272-1660. The examiner can normally be reached between the hours of 7 AM to 4 PM (Eastern Standard Time) Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Loke can be reached on 571-272-1657. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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A handwritten signature in black ink, appearing to read 'Ori Nadav', with a stylized flourish at the end.

O.N.
7/19/05

ORI NADAV
PRIMARY EXAMINER
TECHNOLOGY CENTER 2800